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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

May 2, 2004

Roy Ball
Environ Corporation
740 Waukegan Road
Suite 401
Deerfield, IL 60015

Dear Roy:

Enclosed you will find comments on the draft "Human Health Risk Assessment", prepared by Environ for the RI/FS at the Eagle Zinc Company site in Hillsboro, Illinois.

General comments

At the February meeting at EPA, EPA specifically stated that a future residential scenario at the site including appropriate risk calculations was to be provided-this was not included.

The document includes a justification for not including the residential scenario as the Superfund Ready for Reuse guidance. EPA stated that this was inappropriate.

Concentrations of lead and cadmium are elevated in a few off-site sediment samples. However, no risk calculations were done for these samples.

A-C pathway pathway from pile not uncomplete

Exposure point concentrations in soil appear to be averaged across the site, which will result in the HHRA missing potential hot spot areas. Not all of the sampled media (particularly residue pile samples) have been included in the risk assessment.

The analysis of potential inhalation exposures and risks does not appropriately represent site conditions. An expanded air pathway analysis may be required to assure that risks from dust emissions both on and off-site are properly addressed. Screening levels based on inhalation exposure pathways will need to be recalculated to incorporate the results from the revised air pathway analysis. In addition, the HHRA does not include the off-site garden exposure scenario previously requested by EPA.

Some of the screening levels have been calculated using inappropriate toxicity values, and will need to be recalculated.

Documentation of portions of the HHRA methodology is not adequate to verify that those portions were implemented correctly.

Specific comments

1. Page ES-1 paragraph 3: Delete the last sentence making reference to the Superfund RfR guidance. This statement would be appropriate in the Feasibility Study. It is not appropriate in the HHRA

2. Page ES-2, Paragraph 1, bulleted list of exposure scenarios evaluated: The list of exposure scenarios does not include the On-Site Resident. In previous correspondence and in the February 18, 2004 meeting, it had been communicated by EPA that the HHRA include calculation of risks for the On-Site Resident scenario.

3. Page ES-3, Paragraph 1: The stated risk assessment approach involves calculation of risk-based screening levels associated with specific exposure pathways and exposure factors. To account for cumulative exposures and risks, the screening levels and exposure point concentrations are used to calculate ratios that represent total pathway risk from multiple chemicals. It is stated that total risk/hazards are calculated in each exposure media, and are summed across all media to obtain a cumulative risk estimate for each scenario. This appears to address previously raised concerns that the HHRA provides cumulative risk estimates, even though this approach is substantially different, both conceptually and computationally from USEPA's *Risk Assessment Guidance for Superfund, Part A*. Please incorporate into the HHRA reference to USEPA's Region 9 PRG documentation, which incorporates a procedure for calculating cumulative risk estimates using risk-based screening levels.

   The terms "screening level cancer risks" and "screening level hazard indices" are used throughout this document. However, the authors do not: 1) identify where these represent

terminology derived from risk assessment guidance, or 2) state the outcome of a screening level analysis, which is to propose a more detailed and refined risk assessment, if needed, based on the screening level results. Please revise the text to focus on more transparently characterizing the uncertainties and conservatism in the numerical risk estimates rather than dismissing those estimates as "screening level", implying that they are significantly exaggerated in some unsubstantiated fashion. Please delete references to "screening level cancer risks (SLCRs)" and "screening level hazard quotients (SLHQ)" throughout the document.

4. Page ES-3 par 2. Please reword the third sentence (starting with "Because the area of affected sediment. . .) as follows: ". . . *by occasional contact with sediment, the finding that individual sample results exceed a residential screening level for lead does not necessarily indicate that there is an elevated risk associated with lead in sediment.*" Risks to off-Site residents from lead and cadmium in sediments need to be calculated and incorporated into the HHRA.

   It states in the last sentence that further characterization may be needed to evaluate the levels for lead in sediment but nowhere in the document are any recommendations on how to collect this additional information.

5. Page ES-3 par 3. What are the site background values for arsenic? It is not acceptable to use a regional background value for arsenic without any site specific data and then rule out arsenic based on regional background values.

6. Page ES-3, Paragraph 4: Please delete the words "significantly exaggerate" and replace with the work "overstate". Please see general comment regarding the need for on-site residential exposure calculations.

7. Page ES-6 Industrial worker. Exposure to subsurface soils is a reasonable exposure for future workers, due to facilities related construction activities.

8. Page ES-6 Trespasser. Exposure to contaminated sediments is a potential pathway and should not be ruled out because of detected contamination.

9. Page 1, Paragraph 3, 1st bullet: The first objective of the HHRA is to provide an analysis of potential risks assuming no remedial action or institutional control, as stated here. This is consistent with EPA's previous comment re:on-Site resident risk calculation.

10. Page 1, Paragraph 4: Please delete this paragraph referring to the Guidance for Preparing Superfund RfR Determination. This information is more appropriately presented in a Feasibility Study because it addresses identification of a potential remedial technology (implementation of institutional controls).

11. Page 4, Section D: The concept of target levels and their use in this document deviates from the *Risk Assessment Guidance for Superfund* documents used for preparation of a baseline risk assessment. At our February meeting, EPA specifically stated that this concept required substantial justification for use at the site. No justification has been provided.

12. Table 1: Exposure pathways for an on-Site resident scenario are judged to be incomplete. While this is correct under current land use, it is not appropriate for purposes of the HHRA to categorically rule out an on-Site residential scenario under future land use. Please add information to this table noting that exposure pathways are potentially complete to an on-Site resident under future land use conditions. Exposure pathways from soil for an off-Site resident cannot be deemed incomplete without more detailed justification. Please include an exposure pathway from ingestion of garden-raised fruits and vegetables for the off-Site resident.

13. Page 5, Paragraph 1: Please delete the last sentence of the paragraph. It is not needed for the risk assessment to be useable for decision makers.

14. Page 5, Paragraph 2: Please delete this paragraph. It does not correctly depict how the results of the risk assessment will be used to support Site decision-making. It is anticipated that cumulative risk estimates, aggregated across all exposure pathways and chemicals, for each scenario will be compared with the guidance provided in the *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, OSWER Directive 9355.0-30, April 22, 1991. Please delete Figure 3 from the document, because it also does not correctly depict how the results of the risk assessment will be used to support Site decision-making.

15. Page 8 indented paragraph. In our February meeting, EPA indicated that substantial documentation was required before this statement could be considered for use in the risk assessment-this was not provided. There are several caveats included in this statement which place substantial conditions on future site use. The first is that this scenario is contingent on a mutually acceptable agreement between the site owners and the City of Hillsboro. The second is that the environmental aspects of the property need to be acceptable to both parties before property transfer is completed. This has nothing to do with calculation of risks and is entirely dependent on the final remedy decision at the site, which is well in the future. Therefore, if this statement is to be considered further, the following two stipulations must be included: 1) Institutional controls must be placed on the property immediately by the current owner restricting any future use at the site to commercial/industrial and 2) all conditions that EPA has highlighted in this comment must be removed from this statement from the Planning Commission.

16. Page 8, 1st full paragraph: Please delete the next to last sentence in the paragraph (which starts "As such, it suggests the applicability. . ."). Please reword the last sentence in the

paragraph (which starts "Therefore, this HHRA is based on. . .") as follows: "Therefore, this HHRA includes a commercial/industrial land scenario based on the assumption that future land use at the Site will remain commercial/industrial."

17. Table 2: Correct the units on the tap water action levels from mg/L to ug/L.

18. Page 9, Paragraph 1: This sentence states, "Screening levels for selection of COPCs in soil and sediment are defined as the lower of Illinois background levels and EPA Region 3's Risk-Based Concentrations (RBCs)". It seems that the sentence should read, ". . . defined as the *higher* of Illinois background levels and EPA Region 3's Risk Based Concentrations. . ." in order to be consistent with how data were screened. In particular, the executive summary noted that arsenic concentrations were screened against the background level and not the RBCs. Which is correct?

19. Page 10, Paragraph 3: The risk assessment has not included all of the data collected from the site in identifying COPCs. In particular, the historical data from the residue sampling piles (see Table 5 of the 2002 *Preliminary Site Evaluation Report*) are not presented and evaluated in the risk assessment. Please include the historical sampling results in the preliminary site evaluation report in the COPC screening.

20. Pages 10 and 11, Section C: Additional information is requested to verify that the exposure point concentrations presented in Table 8 have been estimated correctly. Please provide a list of samples used to develop the average concentrations in sediment and soil. Please include the historical residue pile data provided in the *Preliminary Site Evaluation Report* (see Table 5 of that report), and characterize potential risks associated with contact with the residue piles as separate exposure units. Please provide a description of the size of the exposure units in soil and sediment represented by the average concentrations. Note that in the Phase I Technical Memorandum, *Remedial Investigation Phase I: Source Characterization*, onsite media (soils) are divided into several investigation areas (see Figure IV-3), which should be regarded as exposure units. Please calculate exposure point concentrations for each of these areas for purposes of characterizing health risks. Please describe the statistical methods used to test the distributions before calculation of the UCLs. For each contaminant and media, please note if the exposure point concentration is based on a distribution (i.e., UCL on the average), the maximum concentration, or a concentration from a sample location within an exposure pathway. Note that USEPA has issued guidance in 2002 (*Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*, OSWER 9285.6-10, December 2002) for calculating exposure point concentrations that may supersede the 1992 guidance cited in the HHRA. All data should be included in risk assessment calculations.

21. Figure 2: Please make the following corrections to the conceptual model of exposure pathways: 1) include as a complete exposure pathway direct contact with surface soil to

a resident; 2) show the "particle suspension --> air flow/wind --> surface soil" pathway as complete to an offsite resident; 3) add residue piles as an exposure media to onsite receptors.

22. Page 13, Paragraph 3 (Section III.A.). Description of potential contaminant source areas is not adequate for purposes of understanding how sampling and analytical data represents potential exposures to human or ecological receptors. For example, on-site soil samples appear to have been collected beneath residue layers that are apparently on the surface (see Table II-1, Soil Sampling Summary in the Phase I Technical Memorandum). Please update this section to define where soil samples have been collected. Residue pile results from sampling conducted in 1998 (presented in the Preliminary Site Evaluation Report) detected elevated concentrations of lead. Please include a description of the residue data to this section.

23. Table 8: Add exposure point concentrations in soil and sediment for child and adult residents.

24. Table 9: The source for the calculated PEF is listed as Equation B-8 in EPA, 2002a. The value is produced by Equation 6 on Page 27. Please provide the correct citation.

25. Page 14, Section C (potential receptor populations): Add Off-Site Residents (future) to the list of receptors. As is stated previously, the contingencies currently placed on the potential sale of the property. If this potential acquisition is not completed, or another potential developer comes forward, the potential for other site uses is increased significantly so the calculation of baseline risk for the on-site residential scenario becomes more critical.

26. Page 15 1st 4 lines. Worker exposure risk calculations should be based on exposure to maximum contaminant concentrations, not an average across the site.

27. Page 15 trespasser. What about the VOC concentrations in the drainage ditch leading to the SW pond? What is the risk associated with exposure?

28. Page 15 off-site resident. Please see previous comment about air impacts from the residue piles.

29. Page 16, last paragraph: Delete the discussion of proximity and location of off-Site deposition impacts based on prevailing wind direction (3rd, 4th and 5th sentence in the paragraph). Not detecting visible deposition in the downwind direction is not credible evidence that there is no off-Site deposition of contaminants. . The *Preliminary Site Evaluation* report states, *"the existing residue piles do not appear to be a source of airborne dust emissions. These observations include the relatively large grain size of the materials exposed at the surface of the stockpiles, the consolidated/compacted nature of*

the older stockpiles and no observed a airborne dust in the areas of the piles during windy conditions. Potential impacts resulting from historical emissions will be evaluated through soil investigations proposed for the RI/FS Work Plan" (see pages 20-21). However, the investigations conducted during the RI do not appear to have addressed this pathway, and the HHRA do not provide any data to support these assertions. Please state in the HHRA conclusions that the exposure pathway from dust resuspension from the piles and deposition onto offsite soils is potentially complete, and that risks through this pathway have not been quantified (this should be completed as an additional exposure pathway). Also state that this uncertainty potentially leads to risks being understated from the residue piles. There are data gaps that preclude conducting a meaningful air pathway analysis, however, it is not proposed that the risk assessment be delayed to collect those data for an air pathway analysis. Additional data to evaluate the potential offsite air pathway can be collected as a part of the FS or during remedial design.

30. Page 18 2nd full par. Language regarding the significance of the groundwater pathway related to contaminant levels below Environ's screening levels is inappropriate for use in the HHRA. Baseline risks are to be calculated to allow the Agencies current information from which to based remedial alternatives screening on.

31. Page 19 1st 5 lines. Previous NPDES sampling did not include the contaminants that are part of the current sampling program at the site. The statement about ongoing discharges is not substantiated and should be modified.

32. Page 19, Paragraph 2: Were ingestion and dermal contact of Lake Hillsboro surface water considered to be complete exposure pathways and quantified in the risk assessment? Please add a statement clarifying this point.

33. Page 19, Paragraph 3: Insufficient justification is provided for not quantifying risks from contact with sediments in on- and off-Site surface water bodies. According to Table 4, the maximum concentration of cadmium in sediment is 550 mg/kg, and the maximum concentration of lead is 2,700 mg/kg. These values are well above screening levels, and the HHRA identified these and other metals as COPCs in sediment. Please quantify potential ingestion and dermal exposures to off-Site residents (adult and child).

34. Page 19, Section E: Include a statement in this section pointing the reader to Section V for the equations used in developing the screening levels.

35. Table 15 (cadmium and manganese RfDs): Please recalculate screening levels for cadmium in soil and sediment using the oral RfD of 0.0005 mg/kg-day. There are no data indicating that the gastrointestinal (GI) absorption of cadmium from soil is the same as the GI absorption from food. Please recalculate screening levels for manganese in soil and sediment using the oral RfD of 0.047 mg/kg-day. According to the IRIS profile for manganese, the 0.047 mg/kg-day value should be used to characterize risks from

manganese in soil.

36. Table 15 (TCE toxicity values): The citation for the TCE toxicity values is incorrect. The values presented in the table are not recommended by NCEA. Toxicity values for TCE have been withdrawn from IRIS, and no new values are available at this time. Revised toxicity values for TCE are currently being reassessed by USEPA. The text in Section IV and Table 15 should be revised to reflect the actual status of TCE toxicity values. The values presented in Table 15 may be used for characterizing TCE risks. However, a separate calculation of TCE risks must be performed using the provisional high-end cancer slope factor and the RfD from USEPA's 2001 TCE risk assessment, and discussed as an uncertainty in Section VI of the HHRA.

37. Table 16: The footnotes are not presented on Table 16, so that the physical and chemical properties can be verified. Please add the footnotes to this table. Note that the BCF value for cadmium is considerably understated. Additional information needs to be provided to justify a BCF of 50 for cadmium. Also, bioconcentration of arsenic and lead into fish needs to be calculated and included in the HHRA.

38. Page 27, Equation 6: Calculation of a default PEF does not provide an adequate air pathway analysis of potential dust emissions from the Site, and as presented in the HHRA may substantially understate the target levels in soil for the inhalation exposure pathway. As described on page ES-1, the Site covers 132 acres, of which some fraction represents potential dust emissions sources. The inverse dispersion coefficient (Q/C) value represents a ½ acre source area with an assumed fraction of vegetative cover of 0.5. Therefore, it is not be appropriate to apply the PEF to surface areas larger than ½ acre. Please recalculate the Q/C value so that it represents the size of the Site and the actual extent of vegetative cover. As described previously, there are data gaps that preclude conducting a meaningful air pathway analysis for the site. The HHRA should include discussions of the uncertainties in the evaluation of the air pathway. Please confirm that the mean annual wind speed used in the emissions modeling reflects Site conditions. Please provide discussion in the HHRA of how the default threshold wind speed compares with the surface conditions and grain size distribution in surface soils and residue piles (for example, if the mode particle size in onsite surface materials is smaller than the default assumption, the threshold wind speed used is not conservative). Note that if the annual average wind speed and threshold wind speed are revised, then the F(x) value also will need to be recalculated. Target levels in soil for the inhalation exposure pathway will need to be recalculated to incorporate the revised PEF.

39. Section VI and Tables 17-28: Based on the previous comments, revisions to the HHRA are required that will result in changes to the screening levels, estimated risks and characterization of risks associated with the Site. However, the tables contain several spreadsheet glitches (#NAME? error messages) that should be corrected before resubmitting the HHRA.

Because of the large volume of comments and the significant errors and omissions from the HHRA identified by these comments, EPA hereby notifies the Parties that if the revised HHRA does not completely address the comments outlined above, EPA reserves the right to complete the revisions to the HHRA for inclusion in the administrative record for site remedy decisions. Please submit the revised HHRA in accordance with the schedule contained in the AOC.

If you have any questions regarding these comments, please contact me.

Sincerely yours,

Dion Novak
Remedial Project Manager

cc: T. Krueger, EPA
C. English, CH2M Hill
R. Lanham, IEPA